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The Plight of the Neurastheniac

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Medical Book News Editorials

Contemporary Progress

Vol. 73 No. 4

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EDITORIALS

Why Medical Truth Still Wears a Veil

THERE is no good reason why a disparity should prevail between scientific and social progress. Oehser, writing in the *Scientific Monthly* of March, 1945, quotes Charles Beard as declaring that "Political democracy and natural science rose and flourished together." Then Oehser himself observes: "It may be that we have reached an impasse (the world in a mess, despite the great achievements of science): that the truth shall make men free, but that men cannot know the truth until they are free."

It follows that when we are free we shall know more of medical truth. Maximum progress waits upon a better social order. Unity and integration of scientific and social progress will then be more nearly attained.

First Things First

"HOW to make preventive medicine socially effective is perhaps the greatest problem of all. Certainly it is the most complicated for it involves not only the whole medical realm but the public itself." So declares the Committee on Medicine and the Changing Order of the New York Academy of Medicine.

"A sound economy which will insure proper diet, good housing, decent wages, and above all full employment, is essential to a forward-looking and effective health program." So declares Mr. Louis H. Pink, President of the Associated Hospital Service of New York.

No matter how good the present or future system of medical care may be, whether under private practice or under nationalized medicine, or both, preventive and curative medicine will not be socially effective unless Mr. Pink's postulate of a sound economy becomes reality. A change in the social order, not in medicine, comes first.

Brave [?] New World

MOST of us have believed that the nationalization of medicine would simply be an entering wedge; we have thought of it as a beginning phase of the authoritarian State. This conception of a dragooned medicine at the hands of a planned State finds confirmation in Sir William Beveridge's second report on his social-security scheme, just published by a New York firm. From this we learn that besides the control of medicine, Sir William looks forward to the control of food, fuel, clothing and labor. The Minister of National Finance under his scheme would plan both private and public outlays. No new factory could be built unless approved and the builders could not locate it anywhere. Registered labor (all over eighteen) would be controlled as to place of work, in other words the mobility of labor would be State-organized. Consumption would be guided by taxation and price and wage control. All private investment would be directed—approved or disapproved—by a National Investment Board.

It sounds incredible, but this is the intention and the plan. It is easy to see how a controlled medicine, as a starter, would set the pattern; thus the individual physician would be located and moved by the Ministry of Health.

With regard to international trade only countries adopting the system described would be traded with—which reveals very clearly the British planners' view of how American relations are to be shaped, and perhaps explains much of the weird activities of our own planners. All such trade would be rigidly controlled.

Basic in all this is heavy taxation and intentionally huge deficit spending. "There is no financial limit," says Sir William, to spending by the State within its own borders."

In our February issue we published details regarding the reaction of the British Medical Association to this bureaucratic threat. The reaction was just what one would expect of determined Englishmen unable to accept security at the price of serfdom. It seems a strange and tragic situation in a land with England's great past; yet the situation exists and is believed by many to indicate the way the British people are traveling; nor can we affirm that no soil friendly to such seed exists here.

The Most Ignoble Phase of Attempted Nationalization of Medicine

IF it is true that 70 per cent of the families in the United States have incomes of less than $3,000, and 50 per cent less than $2,000, it is obvious that most people cannot meet the costs of proper medical attention.

Certain social powers that be, instead of trying to get such families out of their plight, ask the medical profession to ameliorate and at the same time perpetuate the plight by itself adjusting to it.

Why are they in such a plight? There is a clue to this in the wide divergence in death and disease rates between the well-to-do and the poor. In order to be healthy, as Dr. Bernard Stern reminds us in his *American Medical Practice*, people must receive incomes sufficient to provide the necessities of life. Now this is not possible so long as so much of the assets and resources of the country produce profits for only a few persons. Just for example may be cited the fact that in 1937 the 10,000 persons with the highest dividend incomes owned about one-fourth of all stock of American corporations, while less than 75,000 persons, or less than one per cent of all stockholders, and less than one-fifth of one per cent of all income recipients, owned fully one-half of all corporate stock owned by individuals (Stern).

Michael Davis admitted at the *New York Times* meeting (February 7) for the discussion of the topic "Public Health and the Doctors" that to raise the incomes of the lower groups in this country enough to enable them to purchase proper medical care would require an economic revolution. Dr. Morris Fishbein suggested at this point that the proponents of compulsory health insurance were attempting to put into effect a revolutionary proposal at the expense of a single minority group, the physicians. "We all like to make a revolution on the other fellow," he said.

So it is rather easy to see the genesis of all the pressure that is being put upon the medical profession, and in what direction the remedy really lies.

A moral obligation rests upon us not to be made the means whereby certain forces can continue wholly to evade decent social solutions.

Anti-Leprosy Program

COMMANDER Corydon Wassell, famed Navy Doctor, urges public support of the Postwar Anti-Leprosy Program of the American Mission to Lepers, to be carried on in eight countries.

Commander Wassell, who earned the Navy Cross for his evacuation of a group of wounded men from Java during the Japanese invasion, and became the hero of a book and a motion picture, says that there is no reason why a person suffering from leprosy should be a social outcast any more than one who has tuberculosis or malaria. As a medical missionary in Wuchang, China, from 1914 to 1927, he saw and treated many cases of leprosy.

American Geriatrics Society

1945 session cancelled voluntarily in order to cooperate in every way possible with the office of defense transportation. Please plan for the 1946 meeting now. Notify Chairman of Program Committee, Dr. E. B. Allen, 121 Westchester Ave., White Plains, N. Y., regarding any paper you wish to present.

MALFORD W. THEWLIS, *Secretary*,
Wakefield, R. I.

THE PLIGHT OF THE NEURASTHENIAC

George H. Hoxie, M.D., F.A.C.P.
Berkeley, California

DURING the last few years neurasthenia has come more and more into public discussion, due perhaps to the war's revelation of the number of men rejected for service on account of mental and nervous instability, also to the growth of Freudianism as a topic of discussion among the laity, and finally to the increased discussion of psychosomatic medicine among members of the medical profession. In such discussions, neurasthemia is glibly referred to, but with a minimum of exactitude. Since the discussion of mental hygiene in the rearing of children, in the home, and in the school, is still spreading and becoming intensified, it certainly would help if we knew what is meant when the word is used.

In the 1943 edition of Osler's *Practice* (Christian) neurasthenia as defined might mean anything from selfishness to psychosis.

In the 1943 edition of Dorland's *Dictionary*, neurasthenia "is a psychoneurosis or nervous exhaustion characterized by abnormal fatigability. . . . It is usually due to prolonged and excessive expenditure of energy, and is marked by a tendency to fatigue, lack of energy, pain in the back, loss of memory, insomnia, constipation, loss of appetite, etc."

On the other hand in Weiss and English's *Psychosomatic Medicine*, neurasthenia is narrowed down by this statement: "The neurasthenic individual is one who has been deprived of love during the early years of life. He has been neglected by busy or self-centered parents. He grows up fearful and lonely." (P. 32.) According to Weiss and English, the symptoms are fatigue, irritability, and low spirits, and vague gastro-intestinal complaints. (P. 551.)

Weiss and English make other attempts to clarify the concept of neurasthenia, as witness these quotations:

"The *conversion hysteric* is ill usually only periodically and then recovers. The *neurasthenic* is ill and morose but is always a little apologetic about his incapacity. But the *anxiety hysteric* can be ill for years with the utmost nonchalance." (Weiss, p. 554.)

"The neurasthenic has been deprived in his early childhood and he brings to his physician his helpless, dependent, childish attitude. He presents himself in such a way as to put the whole responsibility for his health, happiness, and success on the physician without himself wanting to participate in any way." (Weiss, p. 552.)

"The neurasthenics are asking for all of the satisfactions which they did not get in early childhood, and the request is unfulfillable." (Weiss, p. 552.)

"This inertia or negativism [of the neurastheniac] can be annoying to everyone; and the physician is no exception. He generally reacts in the same way as everyone else, and perhaps more so. It is this unfortunate characteristic of the neurasthenic, more marked than that of any other neurotic, which has prejudiced the medical profession against attempting to treat the neurosis." (Weiss, p. 552.)

A good example of the vagueness of the word is found in a German brochure issued in 1921 by Dr. A. Müller. The title is, "The influence of their nervous condition on the life and work of Bismarck, Nietzsche, Scheffel, and Möricke." (Der Einfluss nervöser Zustände auf ihr Leben und Schaffen: Vier Krankheitsgeschichten von Dr. med. A. Müller, Sanitätsrat in M.-Gladbach. Bonn: A. Marcus and E. Webers Verlag, 1921.) Bismarck suffered from leg cramps, rheumatism, and indigestion. Nietzsche was on the contrary a delicate child, short-sighted; he suffered from migraine and died insane. Scheffel suffered from migraine and manic-depressive psychosis. Möricke was also psychotic. Yet Dr. Müller calls them all neurastheniacs and points out the good effects of massage on them all.

THUS it would appear that the term means only what the user wants it to mean, for there are no objective limitations to the word. Therefore, when I see the term used I take it to mean that the doctor in charge could find no organic lesions to account for the patient's complaints. But there does seem to be a tendency to agree on the type of complaints covered by the word. The patients feel "*so* tired." This distinguishes them from the so-called neurotics—those people who show excessive reaction to ordinary

stimuli. It ought also to mark them off from the psychotics, from the myasthenics (where the trouble is a real neuromuscular weakness—a weakness capable of demonstration). On the other hand, the definition of psychasthenia as "a functional neurosis marked by stages of pathologic fear or anxiety, obsessions, fixed ideas, tics, feelings of inadequacy, self-accusation, and peculiar feelings of strangeness, unreality, and dispersonalization" (Janet) would leave a wide margin of doubt as to which is what—for again the definition is based on subjective sensations to be interpreted by different observers in different ways.

Fatigability may be due to metabolic disturbances, to real exhaustion from overwork and exposure, or to endocrine imbalance. Therefore one has to keep watch of oneself when listening to the complaints of a new patient in order to find out if the complainer is *always* tired, or tired only after physical exertion, mental exertion, emotional strain, or when without adequate nourishment or rest. The accompanying insomnia doesn't help to mark out the neurastheniac: for sleeplessness follows almost any prolonged strain, except a purely physical one.

Thus the term does not connote mental weakness or anything disgraceful. It signifies that its victims cannot carry through to successful completion the projects which their minds easily outline, and their emotions crave.

TO check these theories, I turned with curiosity to my records of patients whom I had watched for twenty years and who had shown signs of "neurasthenia" and whose death certificates I had signed or assented to. First there were three who might be designated as "spoiled"; that is, people who had been allowed to have their own way because if they didn't, they would become ill—in the popular parlance, "throw a fit." Of these three, one died of hepatitis, one of old age, one of circulatory failure in her seventies. There is a fourth, not yet dead and now in her sixties, who has diverticulosis. Then there is the group of "cheerful complainers": two of these died of perforative appendicitis (the symptoms were so mild that no one suspected a virulent lesion); two others died of perforation of the gut elsewhere. (In all four cases the wall of the gut was found to be atrophic and thin.) One man diagnosed as a neurastheniac finally died and we found an esophageal diverticulum which had developed into a mediastinal abscess.

Another case history, diagnosed elsewhere as nervous exhaustion, deserves more mention. The patient was 39 years old when I saw her first in 1911—the mother of a boy of 6. Her complaint was weakness and, since that childbirth, constipation and headache. I saw her at intervals during the following years. But that doesn't mean that she had no complaints—for she consulted many physicians, locally and in other cities. In 1917 rheumatic pains dominated her complaints. In 1920 she had "sciatica" while in California. In 1922 "stomach troubles" and her right thumb became black and sore. (It returned to normal under typhoid vaccine treatment.) In 1925 rheumatism again. In 1928 the right thumb again became red and blistered and the nail roughened. Late in the year occasional temperatures of 100° F. In 1929 at the ——— Clinic, no organic lesion could be found: Diagnosis: "chronic nervous and physical exhaustion." In 1931: angioneurotic edema of left orbit. During the next five years she was kept going by the use of salyrgan and arsacetin. In 1936, she had pneumonia followed by empyema which was successfully drained. Later (August) a herpes zoster of the left buttock with soreness and tenderness over the lumbar spine and left kidney region. Four months later while in the hospital following a transfusion with citrated blood to stimulate her waning strength, she had convulsions—the uric acid reaching to 11. Following this she was euphoric for a few days, but soon the former depression returned, and in the next month (January, 1937), while in bed at the hospital, she called her nurse and told her that another convulsion was coming on. Then she quietly died: first the heart and then the breathing stopped. No postmortem examination was permitted. The story is given at this length to illustrate the point that the bad feelings of the neurastheniac are not always imaginary.

In my records I found other cases showing the lowered resistance and occasional organic lesion to be found in this group of people, who drag out their lives only by constant effort—for example, one woman away back before World War I was sent to consultants and sanatoria without relief; and the postmortem exam-

mation showed pernicious anemia.

SO the complaint of being tired always calls for a complete check-up of the patient's psychosomatic condition. Only after exhausting every diagnostic resource should the verdict be neurasthenia.

(In *Psychosomatic Medicine*, Vol. VI, no. IV, Oct. '44, p. 334, there is detailed such a study—and this one uncovered chronic brucellosis.)

All this means that we should not treat the neurastheniac with "contempt." It is just because of this tendency on our part to do so that we now have so many cults. The psychosomatic movement should help us. But that movement is in its infancy. In the meantime we can read the psychoanalyst's explanations of the psychoneuroses and realize that there are many things "undreamed of in (our) philosophy."

What the neurastheniac wants first of all is sympathy. And then on the basis of sympathy he or she wants an exhaustive study of the condition both somatic and psychic. And this is where the rub comes; for few patients can afford the x-ray and the elaborate laboratory studies needed to run down each elusive symptom—even if every one of us had the equipment at hand.

But we can be sympathetic, we can try to understand the problem, we can advise and help plan for more rest and a better outlook on life while we seek to decide whether the trouble is due to somatic faults, or psychic trauma, or just plain selfishness and malingering.

But let's not use the word neurasthenia unless we mean it!

Care of the Neurastheniac

The *Kansas City Star* in November 1943 reported an interview with Dr. Walter S. Maclay, a London psychiatrist, on the treatment of soldiers with nervous disorders. Here are some pertinent excerpts:

"It wasn't the nerve-torn casualty from Dunkerque, or shell-shocked fighters from subsequent battles on land, sea or in the air, who tested the hospital's treatment facilities. Most of them were calmed and made near normal by special shock treatments using insulin or electricity, or by a 10-day drug sleep.

"The big headache to the war psychiatrist is the self-centered neurotic who had never seen battle, who didn't fit in, who couldn't hold up his or her end of the common load. These persons, moreover, were as much a civilian as a military burden, and their treatment will remain a peacetime as well as war task.

"We try to get them to change their outlook toward themselves and life. We aim to help them consider the needs of the community rather than their own nervous orders. As with a toothache, the best way to deal with it, until the cause of the pain is fixed, is to get your mind off it.

"We organize group treatments in which persons showing certain common disorders are instructed together. Thus, those people who tire very easily, in the mistaken belief their hearts are weak, when in fact nothing is organically wrong with them, we assure and educate. We arrange for regular physical training, mostly of exercise; for occupational training where it is indicated, as carpentry, gardening, typing, sign writing, etc.; for regular eating and sleeping hours and for a normal sex and emotional life.

"The idea is not to cushion these peosons against the normal facts and risks of living. We do not offer the nerve-shocked the prospect of a soft existence in a government hospital the rest of their lives. Our hospital is within bombing hazard from the air. We try for rehabilitation, not shunting them off to bed or perpetual care—and the results are very encouraging.

"Getting the square pegs out of round holes is another big job at the Mill Hill hospital. The doctors and nurses are especially trained to study patients, so that the soldier who really desires to fight but was stuck away in the "pay corps" gets a chance to fight—and vice versa. The hospital works with the war and labor departments of the government, to get persons reassigned to work they like and show aptitude for. Needless to say, military malingerers are carefully spotted and handled."

This gives a vivid picture both of the problem of the psychoneurotic and also of his care. Although this is from England and in wartime, the principles apply equally well to America and to peacetime.

IN America psychosomatic medicine has been under discussion for a decade or more. But it is just now receiving popular recognition. The term signifies that there is an interaction between mind and body in the production of disease. Thus some organic (or somatic) diseases are made worse by the patient's mental attitude—and possibly some are caused by the

poor functioning of the mind and nervous system. On the other hand, some mental disorders are due to lesions in the tissues of the body, i.e., in the soma.

The psychiatrists—especially the psychoanalysts—seem to regard neurasthenia as simply a psychoneurosis—not something due to somatic lesions or disorders. This is still a moot question, for postmortem examinations of neurastheniacs have revealed organ weaknesses that must have interfered materially with the successful prosecution of the efforts of its victims to win a place in society—a place which the victims coveted and sought. Thus the neurastheniac should be thought of not as a mere complainer, but as a person possibly so handicapped by bodily weakness that he can not hold his own in our complex society.

On the other hand, some bodily ailments seem to be due to what the physicians call psychogenic or mental upsets. For example, in the *Journal of the American Medical Association* for November 27, 1943, Drs. Boland and Corr report their findings in the study of soldiers sent back to a general hospital on account of rheumatism. Of the 269 complaining of joint trouble, 23 per cent proved to be entirely psychogenic, and of the 181 complaining of back (or spinal) trouble, 32 per cent proved psychogenic. An additional 13.8 per cent of the combined groups proved to have lesions made worse by the mental (or psychic) element. Thus a goodly proportion had to be "separated from the military establishment" as unusable.

Again, the weakness of hypoglycemiacs should be noted. These people use up all their sugars in a short time and unless given supplies between meals show symptoms of fatigue and exhaustion. Portis and Zitman *(J.A.M.A.* 121:569-573 (Feb. 20) 1943) point out that this excessive use of sugars may be due to stimulation of the right vagus nerve by the patient's emotions. At any rate, such "neurastheniacs" are relieved by frequent feedings (e.g., milk, fruit juices), especially if supplemented by the administration of atropine.

It is this very complexity of the problem of giving the patient individual treatment that makes the treatment of neurasthenia so difficult—and that explains so many failures. We can't find any set rules or prescriptions in our textbooks. It is a question of personal experience and understanding. Yes, here the "understanding" physician wins out. While this theory opens the door to charlatanism, it also gives the scientific physician, who has some experience with life and living, the chance to work what seem to be real miracles.

Bismarck indulged in strenuous hunts and journeys until Dr. Schweninger demonstrated to him that that was just the wrong thing to do. Nietzsche was sent on travels and journeys to the Alps and to Italy, but seemed better only when his sister or mother came to take care of him. But even then he persisted in his work, writing at his desk for many hours a day. No wonder he was a pessimist.

One recalls these episodes because one often forgets that the neurastheniac needs nervous rest. This is usually difficult to procure. Under some circumstances it can be brought about by a changed attitude toward the outside world which focuses the patient's attention away from himself. Here religion, patriotism, social service, and even ambition come in. The outside interest must be sufficient to take the patient's mind off his discomfort and dysphoria.

If one tries to secure this relaxation by drugs, one must decide between stimulation and sedation. For this no rule can be given. Some patients will require bromide, some strychnine. For example, the patient who has outside interests may be helped by tonics; and the self-centered patient by sedatives.

IN Cutting's *Manual of Clinical Therapeutics*, I cannot find the word neurasthenia in the index. Similarly in other textbooks the term is either omitted or discussed so vaguely that a student or doctor seeking some help in the day by day handling of these patients would be thrown back on his own resources—or have to turn back to the literature from 1850 to 1915. Alvarez' discussions of constitutional inadequacy come nearest to the problem: but one wonders after reading Alvarez whether to turn these patients over to the psychiatrist (if they can afford it), try to reeducate them oneself, or, like Pilate, wash one's hand of all responsibility. They can be helped only when in an environment of appreciation; for we humans are happy only when in the company of those who "appreciate" us. Therefore, the neurastheniac must be guided, if possible, into a work or environment where he (or she) can feel that he

is doing a worth-while job. While this is being brought about: nutrition must be improved, bromides may be needed to tide over crises, the old-fashioned "tonics" containing nux vomica and the phosphates may have to be resorted to.

What I mean is that it is not a matter of indifference whether one prescribes medicines at all or what one prescribes; for the smooth functioning of the body is essential to the recovery from nervous exhaustion whether it is due to physical or psychic causes. Rest is essential. This may mean bed rest or simply a journey to the country, the seaside, or the mountains. It means pleasant environment. We are not happy if we are not in the company of those who appreciate us. Therefore the social environment is as important as the physical. Insomnia is usually the first problem we meet. I fear that we use the barbiturates too often: for they don't help the patient to cooperate. But physiotherapy, dietotherapy, and soothing companionship are most helpful — although occasionally we do meet a patient who needs vigorous muscular exercise.

All these considerations show the value of sanatoria and resorts where the whole environment of the patient can be controlled. Treatment of neurastheniacs in their homes is difficult and usually disappointing—for the whole family has to share in the responsibility and actual care of such a patient and usually there exist some individual antagonisms which becloud the issue and make positive treatment difficult.

And then—if there be no somatic disturbances—comes the question of referring the patient to a psychoanalyst. In doing this one finds the chief obstacle in its cost, both in time and money. In other words only those in the upper third economic bracket can afford psychoanalysis as now practiced. So many of us doctors will have to content ourselves with the study of some such book as Levine's *Psychotherapy in Medical Practice*, and struggle along as best we can. Or one can read of S. Weir Mitchell's work with the psychoneurotics—and take courage for another attempt.

To summarize my story then:

(1) Neurastheniacs usually have deficient machines with which to find places in this complex machine age.
(2) If they can be made content with the roles of "hewers of wood and drawers of water," their lives will be fairly useful, and they will be free from dysphoria.
(3) If they cannot be made content with their lot, then little except storm and stress can be foreseen for them and their families.

2600 Ridge Road.

ANTIRHEUMATIC AGENTS AND THEIR PHARMACODYNAMIC ACTION IN THE PHYSIOPATHOLOGY OF ARTHRITIS AND RELATED RHEUMATIC DISEASE

James M. Tarsy, M.D.
Brooklyn, N. Y.

ONE of the unstressed phases of therapy in rheumatic disease is the therapeutic application of pharmacological agents in accordance with dynamic pathological change.

It is the purpose of this paper, therefore, to stress the variable factors and physiopathological changes incident to rheumatic disease, to deal particularly with the effects of a group of well-known pharmacological agents, sulfur, iodine, calcium, and lysidin, employed here as a therapeutic unit (sodium iodopropanol sulfonate plus calcium gluconate plus lysidin bitartrate), and to assay their dynamic action on the various physiopathological components of the rheumatic cycle. the basis of established dynamic pathology in arthritis or, better still, on the basis of its established physiopathology.

Arthritis, one phase of rheumatic disease, is not a joint disease, but essentially a series of physiological disturbances and pathological changes, involving various tissues of the body as well as those tissues forming the joints themselves. Viewed in the light of this definition, it is quickly apparent that the treatment of arthritis rests potentially on

many complex factors. Measures which merely treat the joints with disregard of the basic underlying physiological changes arising from personality, age, exciting causes, etc., are, in the majority of instances, doomed to failure. By the same token, therapeutic measures directed merely at one phase of the rheumatic picture often prove equally disappointing. It follows, therefore, that arthritis, or any rheumatic state, must be approached in the light of all its complex components. This is particularly true of degenerative (osteo or hypertrophic) as well as rheumatoid (proliferative) arthritis.

Analysis of the etiology of arthritis and other rheumatic manifestations points to three important factors capable of influencing theo nset of this disease complex:

(1) Constitutional (hereditary-acquired factor)
(2) Exciting factor or factors
(3) Physiological inbalance (physiopathology)

These three factors in variable degree are responsible for the great majority of the manifestations of rheumatic disease. For the purpose of this article, only the physiopathology will be considered.

Physiopathology

A REVIEW of specific rheumatic patterns reveals characteristic pathological changes in the joints and surrounding tissues. These changes, unfortunately, are frequently no more than the terminal manifestations of the disease rather than the disease itself. Preceding these terminal manifestations often lies a host of dynamic or physiological disturbances which, unchecked, ultimately lead to well-known irreversible forms of pathology.

These irreversible changes, on which most of our therapeutic efforts are expended, no more represent the disease itself than arteriosclerosis represents the psychic, nervous, and vascular imbalances which have induced it. More important than the *static* pathology of arthritis and rheumatic disease in general, therefore, is the *dynamic* phase of arthritis preceding it, or that phase of "arthritis (rheumatic disease) in-the-making". Any therapeutic effort of significant value must antedate this terminal phase, and be directed at the disturbed functions which primarily induced it (1a).

Physiological Disturbances Incident to Age

THE onset of many rheumatic disturbances in the middle and later decades of life, when physiological processes become retarded or readily imbalanced, points to some form of generalized and local "tissue incompetence" ultimately capable of leading to the varied manifestations of rheumatic disease. This so-called tissue incompetence is manifest in more ways than one, viz., glandular dysfunction, reduced metabolic activity, decreased glucose tolerance, altered detoxication and elimination of local and systemic waste, capillary contraction, impaired circulation, local tissue sensitivity with increased susceptibility to cold and mechanical irritation, and, finally, the onset of cartilaginous and soft-tissue manifestations common to many phases of rheumatic disease.

The observations of Bowie, Rosenthal and Wagoner (2) on the respiration of cartilage point to a definite relation between age and the respiratory power of this tissue. Young cartilage cells were endowed with a small, but well-defined respiratory power which decreased 60 per cent. during the processes of maturation and aging. This decline in respiratory power of articular cartilage was recognizable at the same age period when the first arthritic phenomena became apparent; the decline progressed with the extension of the degenerative alterations. These investigators inferred that the loss in metabolic activity is correlated with the chronological and structural age of the cartilage, and precedes the visible manifestations of the process of aging. The gradual decline of the respiratory power, therefore, might be interpreted as the metabolic equivalent of the process of aging in articular cartilage. These studies are of great importance in chronic rheumatic processes such as osteo-arthritis in which cartilage is primarily involved (3).

Metabolism in Rheumatic Disease

STUDY of the metabolic rate among arthritics in general reveals the existence of a retarded metabolic activity in about one fifth of the cases (1c). This retardation, found in both rheumatoid and osteo-arthritis, and presumably in many other rheumatic patterns of a systemic nature, has been attributed by Pemberton (1a) not to an inability of the body to burn sugar, as in the diabetic, but to a

reduction of blood supply, particularly in the muscles. As the result of this reduced flow, tissues are unable to receive their normal quota of blood, with, in consequence, a delayed sugar removal. This phenomenon is encountered in over 60 per cent. of arthritics (1b), and has been reproduced experimentally. As the result of this reduced blood-flow, the normal metabolic elements in the blood, particularly carbohydrates, fail to reach the tissues, thereby remaining unutilized for a unit time. The role of unutilized carbohydrate as an excitant in the growth of white fibrous connective tissue, a universally present phenomenon in rheumatic disease, has likewise been mentioned by Pemberton (1a) and is worthy of note.

The effects of a decreased general and local metabolism on systemic and local cellular processes are apparent. Since the decrease in general metabolism is the expression of the lessened sum of local tissue metabolism in various parts of the body (1a), it is logical to assume that any measures which improve this systemic and local metabolism ultimately prove of benefit to the body as a whole.

Vascular Changes in Rheumatic Disease

ANALYSIS of the phenomenon of reduced metabolic activity is referable to vasoconstriction and other vascular changes which decrease the amount of sugar and other metabolites utilizable by the tissues. Vasoconstriction, reduced blood-flow, and restricted utilization of available metabolites, is ultimately reflected in a reduction of the general metabolism. Study of capillary constriction, reduced blood-flow, and other demonstrable vascular and circulatory disturbances in and about the joints in certain phases of rheumatic disease, points to the importance of such changes in the production of soft tissue, bony, and cartilaginous phenomena. Since joints are supplied by a net-work of extremely small blood vessels (1a), they are particularly sensitive to circulatory disorders. This has been demonstrated indirectly by a number of investigators (4).

Steinbrocker and Samuels (4b), in their study of the arterial circulation of the lower extremities in chronic arthritis, noted a decrease of cutaneous temperatures and oscillometric reading in a good proportion of cases. Vasospastic states were found to be common to both rheumatoid and osteo-arthritis, but less frequent in the latter. These vasomotor disturbances were attributed to some systemic stimulus probably acting through the autonomic nervous system (5). The inability of the peripheral vascular system in "susceptible" individuals to adapt itself to sudden changes in temperature may explain the frigi-sensitive nature of rheumatic patients as a group, as well as the discomfort experienced by such individuals in inclement weather (6).

Direct evidence of capillary involvement was first obtained by Lombard (7) through study of the capillary beds by means of the ordinary microscope. Kovacs, Wright and Duryea (4c) by a refined technique employing the capillary microscope (1a) noted a definite decrease in the number of skin capillaries in the region of Heberden's nodes and joint swelling. In both rheumatoid and osteoarthritis the capillaries were found to be small, constricted or completely absent. In certain areas of the capillary beds, circulation was visualized with difficulty, being irregular or retarded. Such changes have also been mentioned by Wright and Pemberton (8). Reduction of the normal blood-flow is reflected in an average reduced surface temperature of two degrees in about 50 per cent. of the cases, as confirmed by thermocouple studies, and in a reduction of the red cell count in arthritics, as noted by first and subsequent drop method (1a). Such changes are paralleled in so-called muscular rheumatism. Lunedei, Corrandine (9) and Weil (10) noted in 70 per cent. of such cases similar anomalies in the capillaries of the fingernails. Corresponding figures were obtained by Rhumann (11).

CIRCULATORY disturbances have likewise been held responsible for the production of tissue atrophy. Morse (12), having studied by experimental methods the mechanism involved in atrophy, attributes such tissue changes to autolysis probably induced by a lowered hydrogen ion concentration resulting from vascular occlusion. Bradley and Taylor (13) similarly believe that atrophy occurs as the result of a reduced blood supply, asphyxia and a lowered hydrogen ion concentration, all of which in turn favor autolysis. Finally, it has been shown by experimental methods that even so-called irreversible or organic changes present in rheumatic disease may result from vascular disturbances. As a case in point may

be mentioned the overgrowth of the patella in dogs and rabbits by ligation of its blood supply (14). This overgrowth is of a calcareous or bony nature, as seen particularly in osteo-arthritis of the knees. Such changes have been attributed to a derangement in bone metabolism following tying of the circulation to the patella (1a). Similar experiments conducted in a younger group of animals resulted in slight or negative changes (15). It is interesting to note that parallel results may occur through venous stasis alone (16). The therapeutic implications of such vascular disturbances, i.e., vasoconstriction, amount of circulating blood, rapidity and efficiency of flow in the locomotor system as a whole, particularly in the joints, is apparent.

Toxemia and Rheumatic Disease

THE action of toxic substances, bacterial or otherwise, on the nervous system, and subsequently on the sympathetic fibers of the blood vessels, particularly the capillaries, is well known (5). Toxic states undoubtedly play an important part in rheumatic disease. Great etiologic emphasis has been placed on the products of infection in certain arthritides. Toxic products, however, particularly of an endogenous nature, in the modern school of arthritis, have received scant attention. It appears, none the less, that the role of endogenous poisons resulting from age, fatigue, overwork, gastrointestinal disturbances, failure of detoxication, disturbed elimination, and the action of these endogenous poisons on the nervous system and blood vessels, and hence on the muscles and joints, is deserving of greater recognition. Paucity of information regarding their nature lies not in their absence, but rather in the absence of a sufficiently accurate or refined technique that will make their detection possible. Many poisons resulting as products of intermediary metabolism, glandular dysfunction and a generally disturbed physiology must exist unaccessible to modern investigation (17).

Toxic products originating and absorbed in the intestinal tract are particularly important. According to Strassburger (18), one-third of the total weight of solids of normal feces may consist of bacteria. Among the products of decomposition formed by such bacteria are undoubtedly many of considerable toxicity. The possibility, therefore, of products of metabolism (indole, skatol, phenol, several amines) re-entering the blood through the intestinal wall must be admitted (15a). According to Wells (17a), these products may be formed from food or from the secretions and excretions of the body that enter the alimentary tract; they may be formed by the digestive ferments or by the bacteria in the intestinal tract. "Hence the number of these products is enormous, and we are by no means sure that those that have been identified include the most important or the most toxic . . ." (17a). Some of the proteoses formed from proteins of animal or vegetable sources are particularly toxic (17a). The amines, as products of protein putrefaction, have a marked stimulating effect on the sympathetic nervous system as manifested by increase in blood pressure. Some of these amines both chemically and physiologically resemble epinephrine (17a). The action of amino-acid bases in stimulating non-striated muscle (without raising the blood pressure) has also been mentioned by Wells (17a).

Nervous System and Rheumatic Disease

TOXIC substances when in contact with the sensory nerves and the sympathetic fibers of the blood vessels elicit a protective reflex. They may not only induce vasoconstriction, but ultimately pain. It is also worthy of note that physiological disturbances, though initiating merely as functional processes, when involved in the vicious reflex circle common to many diseases, are eventually capable of leading to organic changes. This concept may explain many manifestations of a rheumatic nature, particularly in articular and periarticular structures, i.e., muscles, tendons, periosteum, etc.

The arteries, supplied by sensory fibers, when subjected to chronic irritation, particularly by poisons of endogenous origin, in unison with other tissues, become involved in physiological disturbances of a local nature. Such disturbed local physiology through mediation of the central nervous system may eventually lead to similar manifestations in other parts of the body (19). Furthermore, the skin and other tissues when irritated become hyperalgesic. In this state, tissues tend to react to even innocuous stimuli with explosive sensations of pain and reflex activity (19). Lewis (20) in his experiments in hyperalgesia has shown that

when injured, the skin elaborates certain unknown substances which render the sensory nerve endings hyperexcitable. Increased blood-flow, by re-establishing vasomotor tone, often results in the relief of pain. It is important to remember that the vicious circle of reflex activity, vasospasm, and pain may be established by systemic as well as local causes. Psychic factors, by lowering the threshold of pain, are also capable of contributing to somatic pathology. It is likewise believed that, aside from psychosomatic states, a parallel but inverse "somopsychic" mechanism may occur.

The above considerations far from being foreign to the subject of arthritis and rheumatic disease are intimately related to it and illustrate the "physiologic unity" existing in the body as a whole.

Pharmacodynamic Agents in Rheumatic Disease

PHARMACODYNAMICS is the study of the action of drugs on the living organism (21). As such, the processes of physiology, physiological chemistry, pathology, and bacteriology are subservient to it (21). Rational drug therapy in rheumatic disease must, therefore, be based on a correlation of pharmacodynamic action with pathologic physiology.

Many pharmacological agents have been extolled in the treatment of arthritis and associated rheumatic processes. Three agents most commonly mentioned are sulfur, iodine, and calcium. Numerous exaggerated claims have been made for the antirheumatic properties of each of them. Sulfur, an age-old remedy, has been alternately praised and calumniated. In spite of dissenting opinions, it has, time and again, been revived from therapeutic obscurity. The difficulty of evaluating the true antirheumatic properties of either sulfur or iodine alone, lies inherently in their rather non-specific pharmacodynamic action, as well as in the very nature of rheumatic processes. Since rheumatic disease is often the result of multiple dysfunctions which require a multiple therapeutic plan, it was decided to evaluate these agents as a sulfur-iodine-calcium unit, rather than each individually.

Both sulfur and iodine have perhaps little effect on the terminal and irreversible manifestations of arthritis. The same may be said of a host of similar agents. However, the value of sulfur and iodine in aberrations of physiological processes preceding and ultimately leading to so-called terminal manifestations is undoubted. In controlled studies, this has been borne out with such repetitive constancy as to claim the unbiased attention of many students of rheumatic disease.

Sulfur

SULFUR is a natural element common to all warm-blooded animals; and, as such, it is essential to growth and the regulation of oxidation and other metabolic processes of the human body (22). It enters into the formation of cell protoplasm, and is abundantly present in blood and cartilage, being indispensable in many biologic processes (23). According to Brown (24), sulfur causes an increase in general oxidation and tissue metabolism. The total nitrogenous output in Brown's experiment was augmented by 8 per cent.; the output of phosphates, 10 per cent.; that of endogenous creatinin, 13 per cent.; and that of endogenous uric acid, 18 per cent. He believes the drug causes an "enormous" stimulation of the xanthin oxidase of the liver. Taken internally, part of the sulfur is eliminated unchanged and part converted in the duodenum into hydrogen sulfide. This formation of H_2S increases peristalsis and exerts a germicidal action on the bowel in the form of one of its oxidation products, pentothionic acid (22). In the blood, a portion of H_2S is combined with organic matter, and part converted into sulfur; the greater portion, however, is eliminated through the lungs, skin, and mucous surfaces. According to Solis-Cohen and Githens (25), sulfur, prescribed for the aged, and for gouty and rheumatic persons, sometimes induces a marked alleviation of headache, muscular, neuralgic or arthritic pain. This therapeutic action is ascribed partly to diminution of enterointoxication and partly to its eliminative action. Sulfur is part of the system involved in the conversion of certain toxic end-products of digestion such as histamine, indole, and phenol, into relatively harmless substances, i.e., thiohistamine and indican. According to Loeper *et al.* (26), it serves an important role in articular nutrition and general metabolism.

In the intestinal tract, sulfur is slightly antiseptic and exerts a mild irritative and cathartic action. The importance of intestinal infection and toxemia in arthritis (27), and the known symbiotic existence of many potentially dangerous

organisms in the human intestinal tract, constitute an important etiological factor which on this basis alone would appear to recommend the use of this element.

Iodine

THE importance of iodine as a constituent of thyroid hormone, and hence its action in metabolism, is an accepted physiologic fact. Since the functioning of the cell is influenced by colloidal changes in the surrounding fluid, the value of iodine in increasing penetrability, especially in sclerosing vascular processes (hence in vascular and cardiovascular lesions), is also scientifically acceptable. Its therapeutic importance as a lytic and resolving agent in tissue pathology, particularly in vascular lesions, is reflected in its action in the vascular, cardiovascular, and granulomatous lesions of syphilis and leprosy (21). Since iodides are not treponemicidal, their action is undoubtedly an indirect one, rendering the vessels and cells more permeable to other pharmacological agents (21). Iodine changes the chemically active elements of bacterial protoplasm; hence its use as a germicide and an amebicide in the purification of water. The importance of iodine in protoplasmic disease lies in its ability to penetrate the cell proper, and by temporarily combining with its albumin (28), aiding in the restoration of normal function. This action is demonstrated in heavy metal therapy.

Since degenerative changes, such as are present in osteo-arthritis and many other rheumatic states, are probably the result of aging cellular processes, the dynamic action of iodine in stimulating cellular exchange and metabolism (29) is apparent. The action of iodine on fibrous tissue, a universal component of muscles, nerves, ligaments, etc., and its importance in processes of a fibrositic nature are also worthy of consideration.

Calcium

CALCIUM completes the group of orally administered elements commonly employed in arthritis. Strictly speaking, calcium is not antirheumatic, but because of its stabilizing action on physiological processes, particularly in the maintenance of the functional integrity of the voluntary and autonomic nervous systems (21), it has been frequently employed in rheumatic disease, in synergistic combination with both sulfur and iodine.

Reduction of ionizable calcium is characterized by increased irritability of smooth muscle tissue, as evidenced by carpopedal and ciliary muscle spasm, spasms of the gastro-intestinal tract, gallbladder, bronchi, and other organs. Its influence in vasospasm and other vascular phenomena appears to be an important one (22). Reduction of blood calcium in rheumatoid arthritis has been mentioned by a number of investigators (30), and is probably concerned in the initiation of peripheral vascular and neuromuscular phenomena present in rheumatoid arthritis and other rheumatic states. Calcium affects the permeability of all tissue cells. Its action on capillaries leads to decreased permeability (21); hence its use in effusions, inflammation and edema.

Its influence on the nervous system is an equally interesting one. Reduction in calcium concentrations causes a stimulation of autonomic ganglion cells. Under such circumstances these "cells are more readily discharged by acetylcholine, and may show repetitive after-discharge following preganglionic volley or may discharge spontaneously." (21) Bronk and his co-workers (31) have shown that high concentrations of calcium block synaptic transmission, and hence the threshold of nerve fibers for electrical stimulation is reduced (32). The importance of the central and sympathetic nervous systems and of such phenomena in the production of many painful syndromes has been mentioned by Livingston (19) as well as my numerous other investigators. The influence of central and autonomic phenomena and so-called irritative nerve lesions in certain phases of rheumatic disease is an entirely unexplored one and may well serve as a future chapter on arthritis research.

According to Robertson & Burnett (33), calcium may act as a defensive agent against certain poisons, especially oxalic and citric acids, with which it forms insoluble compounds. Oxalic acid is particularly toxic, since according to Kunkel (34), it combines with cell calcium. Calcium and magnesium salts increase phagocytosis and leukocytic migration (17).

Lysidin

LYSIDIN (ethylene ethenyl diamine; methyl dihydroimidazole) is a nitrogenous organic substance which has been used since the beginning of the century in the treatment of rheumatic diseases. Its

value as an eliminent of metabolic waste has been demonstrated by a number of investigators (35, 36). The mechanism of its action is believed to be the formation of soluble urates from insoluble substances of a similar nature. Because of this mechanism, it has been employed in arthritis and credited with facilitating the elimination of purine bodies, especially uric acid (37). The results obtained in several cases herein mentioned, i.e., lowering of blood uric acid in patients with chronic gout, and relief of joint and muscle pain in a good proportion of cases, would tend to substantiate its value as a uricolytic agent in gouty disorders.

Results Obtained

THE importance of the aforementioned physiological disturbances in arthritis and other rheumatic diseases, and their possible control with certain pharmacological agents, prompted this controlled study in fifty patients suffering from one or more of the following rheumatic disturbances:

Osteo-arthritis
Generalized and local fibrositis
Myofascitis
So-called muscular rheumatism
Bursitis
Sciatic neuritis
Gouty arthritis
Border-line" rheumatic manifestations not classifiable in any of the above diagnostic groups.

These patients were divided into two groups—(a) objective and (b) subjective. The objective group represented a series of 31 cases presenting objective manifestations which could be evaluated objectively. These manifestations were periarticular and synovial swelling, soft-tissue thickening, possibly of a reversible nature; muscle spasm, palpable fibrositic nodules, muscular contractions, especially of the hamstrings; high blood uric acid, acrocyanosis, and other similar tangible phenomena. The subjective group, comprising 19 patients, presented a variety of painful complaits not amenable to ordinary objective evaluation. In this latter group were included a number of cases displaying so-called irreversible visible or x-ray manifestations of arthritis, such as osteosclerosis (as in sacro-iliac arthritis), synovial thickening, and similar changes. These were classified under "subjective" because of lack of objective means of evaluation of their therapeutic response.

The sum of the above-mentioned drugs (sodium iodopropanol sulfonate plus calcium gluconate) as well as lysidin bitartrate was employed as an effervescent, non-irritating mixture, in doses of one heaping teaspoonful in half a glass of water before breakfast and at bedtime.

Fifteen of the 31 patients in the objective, and all 19 patients in the subjective group received a bland, effervescent mixture resembling in all respects the above-mentioned compound, for a period ranging from two to four weeks before actual institution of therapy. A mixed group representing 10 patients received no other

RESULTS OBTAINED

Objective Group
Number of patients treated—31
Objectively improved—51.6%
Definite symptomatic relief 54.8%
Partial symptomatic relief 22.6%
Doubtful improvement 3.2%
Negative results 19.4%

Subjective Group
Number of patients treated—19
Definite symptomatic relief 57.9%
Partial symptomatic relief 15.8%
Doubtful improvement 10.5%
Negative results 15.8%

	Objective Group	Subjective Group	Controls: From both Groups (Bland Mixt.) 2-4 weeks	Controls: Absolute Control Group (Bland Mixt.) 3 months
Number of Patients Treated	31	19	34	10
Objective Improvement	16	—	0	0
Definite Symptomatic Relief	17	11	0	0
Partial Symptomatic Relief	7	3	5	1
Doubtful	1	2	6	2
Negative Results	6	3	23	7

drug for the total duration of the therapeutic period, which in this case was three months.

Of 31 patients in the objective group, 17 obtained definite symptomatic relief, 7 were partially relieved, 1 demonstrated a doubtful response, and 6 claimed completely negative results. Sixteen of the 31 patients displayed objective evidence of therapeutic improvement. In the remainder, visible manifestations denied any parallel objective improvement.

Among the 19 patients treated in the subjective group, 11 (57.9 per cent.) claimed complete relief, and 3 (15.8 per cent.) claimed partial relief of symptoms. The remaining 5 patients (26.3 per cent.) claimed doubtful or completely negative results. In both groups, the bland control mixture, composed mainly of sodium bicarbonate and citric and tartaric acids, failed on the whole to demonstrate any tangible pattern of therapeutic value. The majority of patients in both groups receiving the greatest apparent benefit was the obese, sluggish, "metabolic type" complaining of rather generalized muscle and joint involvement with only initial or negative signs of intra-articular pathology.

Discussion

ONE of the reasons for the many failures in arthritis and other rheumatic processes is the panacea. Since the causes leading to rheumatic disease are complex, it follows that there can be no single therapeutic measure or pharmacological agent that may be used successfully in all cases. Another reason for such failures lies in the lack of appreciation of the fact that many painful conditions, though perhaps induced by systemic causes, finally operate mainly on a mechanical basis and must, in consequence, be treated as mechanical entities. The therapeutic agents in question are, therefore, not panaceas, but merely guides in the timely treatment of physiological disturbances which are ultimately capable of leading to the more gross objective manifestations of rheumatic disease.

It must once more be emphasized that the pharmacological agents here under discussion, lacking the pharmacodynamic specificity of digitalis and other drugs, are difficult to evaluate from a therapeutic standpoint. The difficulty of this therapeutic evaluation is enhanced by the uncertain or somewhat ill-defined and difficult to control nature of the physiological disturbances incurred in rheumatic disease. The variability of subjective impressions of pain and discomfort from day to day in the rheumatic patient is a notorious one. The psychic effect of any form of therapy must, consequently, be eliminated as much as possible. It is only by means of a controlled study that the therapeutic value of any agent or procedure can thus be determined. It is likewise essential to realize that osteophytes, bony sclerosis and bone growth, as well as synovial thickening and fibrotic adhesions, are irreversible terminal manifestations which can offer no proof of therapeutic efficacy.

That the agents in question are in many instances capable of beneficially affecting physiological disturbances in rheumatic disease is confirmed by numerous students of rheumatic disorders (35-47) as well as by the results obtained in this study.

Sulfur, iodine, calcium, and lysidin, though by no means the only drugs exerting this beneficial physiological response, have been employed here as, perhaps, the most representative of such a group.

The therapeutic compound herein mentioned (sodium iodopropanol sulfonate plus calcium gluconate plus lysidin bitrartrate), on the basis of synergism, palatability, and ease of administration, has lent itself to the present study and would, on the basis of results herein obtained, appear to have particular merit when this form of therapy is indicated.

Summary

1. THE variable factors and physiopathological changes incident to arthritis and associated rheumatic processes have herein been dealt with. It has been shown that rheumatic disease, as a generic term, is preceded by a variety of physiological disturbances which unless brought under control are ultimately capable of leading to the more or less irreversible phases of pathology commonly exemplified in various arthritides.

2. The pharmacodynamic action of various so-called antirheumatic agents — sulfur, iodine, calcium, and lysidin—on the dynamic and static phase of rheumatic disease has also been dealt with.

3. It has been shown that there is a phase of "arthritis in-the-making" in which the pathology is more or less dynamic or "fluid," and comprised mainly of physiological disturbances in the major systems of the body. In this phase, therapy, properly applied, is capable of

leading to recovery in a good percentage of cases.

4. A total of 50 patients was treated. These patients represented various rheumatic disturbances including osteo-arthritis, generalized and local fibrositis, myofascitis, bursitis, sciatic-neuritis, several cases of gouty arthritis, and a number of "borderline" rheumatic manifestations not ordinarily classifiable in any of the above diagnostic groups.

5. These patients were divided into two groups: (a) objective and (b) subjective. The objective represented a series of 31 patients presenting objective manifestations which could be evaluated objectively. The subjective group comprised 19 patients presenting a number of rheumatic complaints not ordinarily amenable to objective evaluation. An additional absolute control group, comprising 10 cases, was also included in this study, but *did not* form part of therapeutic groups *per se*.

6. Sulfur and iodine were employed in the form of the compound sodium iodopropanol-sulfonate. Calcium was employed in the form of its gluconate. Lysidin bitartrate, a uricolytic agent facilitating the elimination of purine bodies, complemented the therapeutic action of the sulfur-iodine-calcium unit.

7. Of 31 patients in the objective group, 17 obtained definite symptomatic relief. Seven were partially relieved, 1 gave a doubtful therapeutic response, and 6 claimed completely negative results. Sixteen patients displayed objective evidence of therapeutic improvement. In the remainder, visible manifestations denied any parallel objective improvement.

8. Among 19 patients treated in the subjective group, 11 claimed complete, 3 partial relief of symptoms, and 2 claimed a doubtful therapeutic response. The remaining 3 patients avowed completely negative results.

9. The majority of patients in both therapeutic groups deriving the greatest apparent benefit was the obese, sluggish "metabolic type" complaining of rather generalized muscle and joint involvement with initial or negative signs of intra-articular pathology.

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31 MONROE PLACE

THERAPEUTIC NOTES

HAY FEVER

INCREASING PREVALENCE AND LATEST METHOD OF TREATMENT

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Denver, Colorado

IN recent years, allergic rhinitis has become increasingly prevalent, probably for two reasons—first, because it is recognized more readily by the nose and throat specialist, and, secondly, because more people are becoming allergic to the inhalant factors which produce it. Pollen is the most conspicuous allergen among these inhalants; and, because hay fever is such a disabling symptom complex, afflicting such an incredible number of people, it is attracting the attention of more and more medical men, as well as the public in general.

The disability and expense encountered in attempting to control this serious symptom complex has prompted an exhaustive study of methods of combat. In Colorado, as well as other places reported, spring hay fever is becoming much more prevalent. During the 1920's and 1930's, spring hay fever in the Rocky Mountain region was rare; but in the last few years, it has increased tremendously. No reason has been determined for this, unless it would be increased susceptibility and possible seasonal changes which make the pollens more prevalent in the air. From the standpoint of incidence, there are apparently more cases of asthma developing from pollenosis than formerly. For instance, during the summer of 1944, I saw twenty-four cases of pollen asthma from one small Western town — all of which were new, although some of these patients had had mild nasal symptoms due to pollen prior to the onset of the asthma.

GRADUALLY, however, patients are becoming aware that medical science now offers some hope of relief to them. They are becoming educated to the use of pollen; and, in increasing numbers, are

turning to the oral method of treatment for desensitization. It is more convenient, and less expensive to take a simple oral antigen at home than it is to report several times a week to a doctor's office for hypodermic treatment. The oral method is safer; unattended by any reaction; and it is more effective. It has been my experience, in twelve years' use of this oral antigen, that twice as many people gain complete relief from oral treatment than are benefited by the hypodermic method.

There are many reasons for this, chief among which is, I believe, the flexibility of dosage offered by the oral method of treatment, adapting itself readily to seasonal and individual requirements. In reviewing the past few summers, which have been extremely bad ones as far as pollen content in the air is concerned, with resultant severity of symptoms, it has been noted that most patients have been compelled to take increasing quantities of oral pollen for relief. Dosages have been reached which were hitherto thought impossible, yet in no single instance have any unfavorable symptoms been reported. On the contrary, complete relief has been obtained by those patients who followed instructions—increasing their dosage under careful guidance to meet their own and seasonal demands, and reporting their symptoms so that adjustment of dosage might be made when necessary. In my recent survey of 3600 cases, it was determined that ninety-five percent were relieved completely of their symptoms.

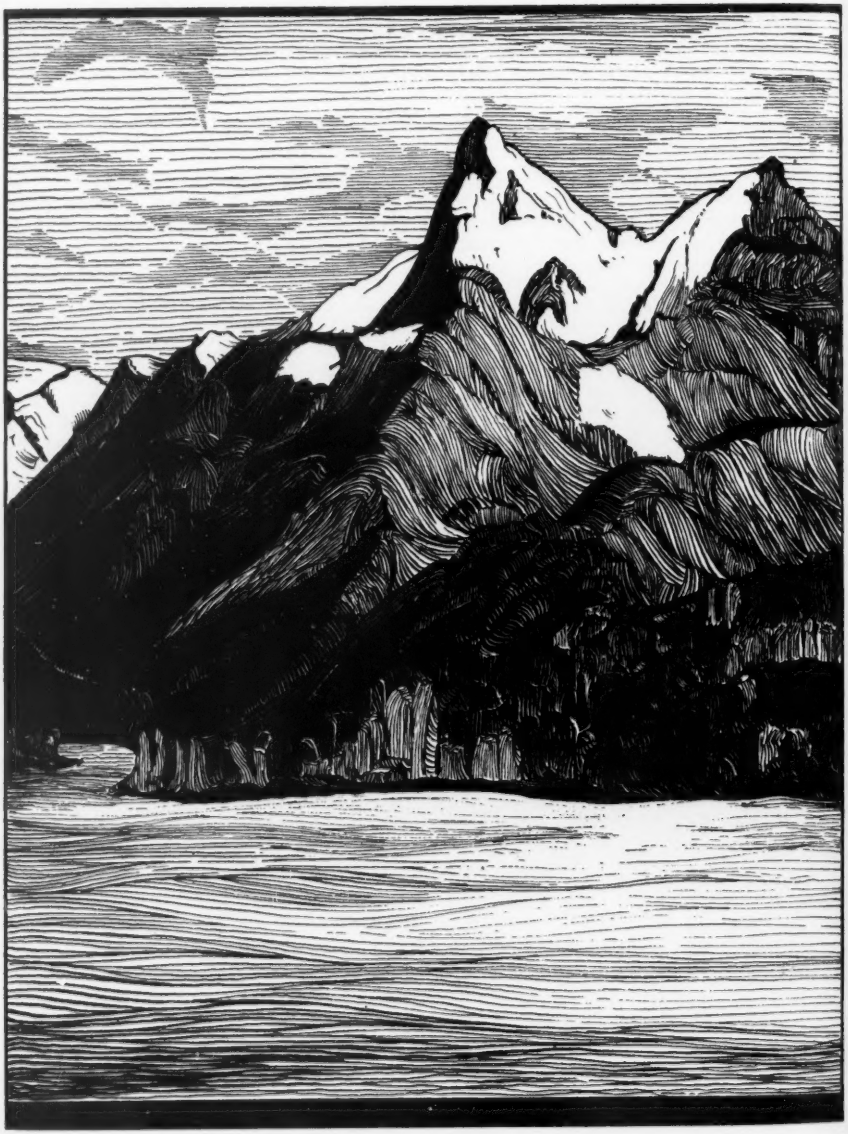
One reason alone—lack of co-operation on the part of the patient in reporting symptoms—seems the only cause for failure. The patient must be impressed with the necessity of doing this, particularly since, in some instances, these reports will eventually reveal the fact that the patient is sensitive to allergens other than pollen (inhalants, foods, etc.). In a small group of cases, it will be discovered that the patient may have polyps in the nose and cannot secure relief until these have been removed, and other nasopharyngeal care given by an expert nose and throat man.

During the pollen season, foods and other allergens other than pollen cause difficulty, whereas outside of the pollen season, they may have no effect whatever upon the patient. However, in most States (and in the South especially), the pollen in the air is almost continuous, there being only about two weeks in the year when surveys show the air to be completely free of pollen. Pollens in the Rocky Mountain region, which seem to be producing more symptoms than a few years ago, are beginning to cause symptoms as early as January or early in February. While there is a brief subsidence between seasons (late April and early May), from then on pollen is present in sufficient quantities to produce constant pollenosis until frost, which, of late years, has been late in October or November.

THE factor which perhaps appeals most to the patient in this oral method of treatment is the extreme simplicity of administering the medication. He is, of course, first tested, to determine to what pollens (or other allergens, such as foods, animal epidermis, etc.) he is sensitive. He is then given a solution of known concentration, usually two per cent, with complete directions for its use. He is instructed to start with one drop a day, increasing the dosage until he has reached twenty drops, at which time he is to report for further instructions. If he is free from symptoms, and the season is not severe at that time, he is permitted to remain on twenty drops, with the admonition that he report immediately should symptoms develop, at which time his dosage will be increased to meet his own and seasonal changes. If he is not relieved after another twenty-drop increase in dosage, it is evident that there is an outside factor which should be investigated, after careful history, by checking certain allergens known to cause difficulty during the pollen season—such as certain foods, i.e., wheat, eggs, milk, or potatoes; and animal derivatives, i.e., dog hair, or animal dander—if the patient reveals a history of exposure. In a few rare instances, an apparent aggravation of symptoms will be caused by over-dosage; but this is usually due to lack of cooperation on the part of the patient in reporting symptoms. Symptoms caused by overdosage cease entirely when the antigen is discontinued. He then is instructed to begin again on one drop, increasing to twenty, until his maintenance dosage is achieved.

One of the most gratifying aspects of this oral method of treatment is the often spectacular results obtained, patients frequently reporting complete relief from symptoms as early as the second day of treatment. Another very interesting group

—Concluded on page 121



Maligne Lake, Jasper National Park, Canadian Rockies

—Adapted from a painting by Sir Frederick Banting

CULTURAL MEDICINE

THE ARTIST IN BANTING

THE fourth anniversary of Sir Frederick Banting's death fell in February, 1945. His passing was a loss not only to medical science but to art, for as a painter Banting ranked high. A. Y. Jackson, in his study of *Banting as an Artist* (Toronto, the Ryerson Press; Boston, Bruce Humphries, Inc., 1943), lists 240 examples of his work covering the 1927-1937 period. We have chosen one of his paintings of Maligne Lake in the Jasper National Park in the Canadian Rockies as the subject of our illustration in this issue of the MEDICAL TIMES because of the striking scenic effects achieved in it.

Jackson, eminent Canadian artist himself and companion of Sir Frederick on many of his arduous travels as an artist through Quebec, the Great Slave Lake country, and the Arctic itself, says that "The idea of painting our own country without looking always to Europe for precedent appealed to him." A recent example of this spirit in the field of literature is afforded by Hugh MacLennan in his novel "Two Solitudes." It is a most admirable spirit because it is a really creative one. Banting's total landscape of his home, Canada, shows us a new and enchanting world. We should think of him as just as much of a frontiersman and discoverer as Cartier or Champlain. Thus we see the nature of the man similarly revealed, whether studied as scientist or artist.

In his early work, says Jackson, Banting, "like most beginners, was quite pleased to make a painting look like the subject but it was not long before he realized that there was a lot more to art than imitation of nature." Through flesh and blood and bones the soul of the country must be revealed. What Banting says of Quebec in his diary he says in his paintings: "I hate to leave this country. There are so many fine things about the people. Life is less complicated. They have simple faith, large families, little of this world's goods and much happiness. They work long hours and steadily, but not too hard. They are never in a hurry. They pay very little taxes—no income tax."

Jackson makes it clear why Banting was drawn to art. To him it was *another research field.* "A big Lake Superior canvas by Lawren Harris upset Banting so much that he went to the art gallery six times to see it. It made him angry. Then he tried to analyse his own feelings. Why should some paint on a canvas so disturb him? So he came round to the studio to see Harris and hear his reasons for painting the picture. He was willing to believe that artists did research work, too. He began to see a kinship between scientists and artists."

Artist, scientist, knight, Nobel prize winner. Is not the artist in him the essential key to the man?

A. C. J.

CONTEMPORARY PROGRESS

PHYSICAL THERAPY

Physical Therapy in Wartime

K. G. HANSSON (*New England Journal of Medicine*, 231:619, Nov. 2, 1944) notes that during the present war military hospitals in the United States and many base hospitals in foreign areas have equipment for electrotherapy, hydrotherapy and thermotherapy and gymnasium apparatus. In Army general hospitals in the United States during the training period, the types of cases treated did not differ much from those in civilian practice—back injuries, painful feet, knee injuries, strains, sprains, fractures and burns. Now that combat casualties are coming to these hospitals, there is an increase in fractures, nerve injuries, burns and wounds of the soft tissues. The treatment in such cases is much the same as in civilian hospitals, with special emphasis on whirlpool baths, occupational therapy, active exercises and massage. One of the outstanding medical contributions of the war, in the author's opinion, has been the revision of convalescent care for injured and surgical patients. The value of absolute bed rest in such cases is being questioned, and various physical therapy measures are being employed to hasten recovery. These measures include general ultraviolet ray therapy, which can be given to groups of patients in large solariums equipped with powerful Finsen carbon arcs; massage; passive and active exercises carefully graded and systematized (these exercises may be begun while the patient is still in bed); and occupational therapy. The author is of the opinion that such measures may well be employed not only in military hospitals but also in civilian hospitals. Such measures not only shorten the period of hospitalization but also improve the condition of the patient at the time of discharge, especially in regard to the circulation, muscular tone, and the nervous and mental condition.

COMMENT

***Rehabilitation and Reconditioning** are on every one's lips and in every paper as if they were newly created and newly developed, yet they are part and parcel of everyday civilian medicine and especially the forte of workers in Physical Medicine who have been revitalising the patched-up casualties of Industry's Peace-time War, since Prometheus first gave the gift of fire to mortals and since man invented the wheel.*

War has simply stepped up the numbers and made the injuries more common, more devastating and closer to everyone. On the Home Front we have 10,000,000 crippled and handicapped, 4,000,000 of whom have permanent physical disabilities, and of these 1,000,000 are under 20 years of age. In 1943, despite gasoline rationing, there were 23,000 killed by motors. This showed a reduction from the pre-war rate of 36,000-39,000 fatalities. In accidents, 97,500 were killed and 800,000 injured; about 42% of these accidents were in homes, 26% by motors and 15%, causing total disability, were in Industry.

Commissioner Corsi of New York State says accidents have doubled between 1935 and 1942 and that in the latter year there were over $36,892,782 in compensation awards. He asks Labour and Management to co-operate with the State Labour Department to reduce accidents and occupational diseases. We might invite home-makers to likewise help.

The National Safety Council and the American Automobile Association have estimated that we have severe injuries, killing or maiming or disabling every minute of the day. 30,000 accidents daily average about 10,000,000 yearly—many are not reported—making about 1,500,000 permannently disabled, of which 50% happen during employment according to the National Health Survey.

So we have a continuous Peace-time conflict that never gives surcease from injury and these casualties are constantly being rehabilitated in office, home, hospital and clinic. Reconditioning among the sick, the ailing, the unfit, is the day-in, day-out job of physicians everywhere—they take it in their stride until it takes them eventually, as always. There is more to do at present because there is more worry, more tension, more depression among

those who have to face the loss or sickness of loved ones, hence accidents and illness are more common. Total U. S. military casualties to date number 782,180 killed, wounded, missing.

Whether in hospital or home, the lesson is being learned that the sooner the sick individual is put to work, mentally and physically, the sooner he is returned to employment or war service. Leaders in Physical Medicine have been stressing the need for early physical therapy, early occupational therapy and early work therapy, day after day, for years. Idleness makes for illness, prolongs illness and is the result of illness. The man or woman who has learned to loaf and like it is harder to get back to work. Only dire necessity, the need to eat, will drive some from their couches and easy chairs.

Occupational and Work Therapy should be a part of every civilian hospital's routine as it is of the military, so as to shorten convalescence, give the patient a healthy viewpoint, teach him new skills or revive old ones, as measures to turn out hale, hearty, healthy workers, free from neuroses, fears, misgivings, inferiority complexes and "vapours." Once give some people a taste of being waited upon and they are nuisances to their families and themselves and a burden to society. Work is the best of all therapy and, the sooner applied, the best for all concerned.

There is nothing more distressing than to try to teach an adult to work after years of idleness. Hands that have never felt the joy of making, creating, doing, at first appear helpless and hopeless beyond description. Patience unlimited, attention to the smallest detail, endless repetition, encouragement of every move are needed to arouse and spur interest and to keep this person at a task until the message reaches and awakens the sleeping brain. Constant supervision, judicious emulation and friendly help from other workers are usually effective, if one can get the first steps to be taken. Any loophole may be taken, otherwise, to escape the bondage of servitude. There are still idlers, burdens to families, from the last war who would have done better for themselves and families never to have returned. This war *gives a different outlook, a greater hope, a promise of better things for those spared — and Industry is teaching its workers, through physicians, the possibility of a fuller life despite handicaps.*

M.C.L.McG.

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Hazards of Hypertherm Treatment

JOHN WALLACE and S. R. M. BUSHBY (*Lancet*, 2:459, Oct. 7, 1944) report 254 cases in which hypertherm treatment was used for resistant gonorrhea; a temperature of 106.6° F. was maintained for eight hours. A detailed clinical, hematological and biochemical study was made in 37 of these cases. The most marked complications of hypertherm treatment in these cases were anoxia and bilirubinemia, which in some cases progressed to clinical jaundice. Hippuric acid tests in the 37 cases studied showed a considerable reduction of liver function. Continuous oxygen and carbon-dioxide therapy reduced the anoxia but did not entirely relieve it; it did, however, apparently prevent circulatory failure; and also diminished the incidence of vomiting. Circulatory collapse occurring during hypertherm treatment is due to a failure of the vasomotor and respiratory centers, not to a reduction of circulating blood volume or to myocardial failure. Hypertherm treatment was found to cause a transient polymorph leukocytosis and a transient hemodilution. There was no evidence of gross renal damage in the present series. Blood analyses showed only a small and transient rise in non-protein nitrogen, and a tendency for both plasma and urinary chlorides to fall. The authors are of

the opinion that hypertherm treatment "must be considered comparable to a surgical operation"; patients with cardiovascular, respiratory, renal or hepatic disease should be excluded from treatment. Before treatment is instituted a diet high in carbohydrate and perhaps protein should be given. The use of oxygen and CO_2 should be continued for at least an hour after treatment or until the patient's color improves. Patients should be kept warm in bed for at least three days or until any jaundice present has cleared. Hypertherm treatment should be discontinued immediately if the systolic blood pressure falls below 100 mm. Hg; if the pulse rate remains persistently over 160 per minute or the respiration rate over 50 per minute; if the temperature is maintained at 107° F. for 15 minutes; if the patient manifests disorientation, restlessness and violence, or coma; or other signs of intolerance to the treatment; if pallor becomes superimposed on cyanosis; and if vomiting becomes persistent.

COMMENT

So few fatalities have been reported from civilian centres where hyperthermy has been given that many take for granted "there's nothing to it". It has been ordered as casually as if it were an ordinary treatment of a few minutes or an hour or so, and the charge and emolument have very rarely been commensurate with the skill, patience, knowledge and experience involved, or the cautions, precautions, worries and dangers never absent for one moment.

It is, therefore, refreshing to find the authors painstakingly evaluating the various details that go to make up this very dangerous procedure, which, until the advent of the sulfa and penicillin compounds was the only method of giving promise of clearing gonorrhoeal infection from the system and ameliorating the pain or symptoms of luetic sequelae, and other conditions.

So far from being "considered comparable to a surgical opration" the fever treatment of medium length is equal to 3 gallbladder operations in the matter of time taken, anxiety involved, dangers escaped and possibility of fatal outcome in unskilled hands. There is a continuous tension from the first moment of induction to the completion of the 24 hrs. of the day given. There have been delayed reactions, some sudden rises of temperature that refuse to return to normal, dehydration and collapse, in addition to the findings stated.

Selected cases only must be given hyperthermy—we usually make an arbitrary rule of none over 50 years of age, which is sometimes transgressed on the pleadings of physician and family. (One deserves anything one gets if this rule be broken against the operator's better judgment.) Never, except as a last resort, and fully understood as such before induction, by physician and family, to whip up failing powers to face future needs, must a chance be taken. One is doomed to regrets, even if successful, for none of those involved, least of all the patient and his close associates, feel that anything out of the ordinary has been done or that it has helped in any way and, whilst cheerfully reimbursing the surgeon for an operation taking one-third or one-quarter the time, they dispute every charge made for the fever process of long duration.

A nurse is prone to break under too long or too frequent sessions or because of disagreeable patients and may announce quite blithely and finally in the midst of a session that she is through, and ethics, loyalty or consideration make not the slightest difference to her—she refuses to continue. Nurses must have special temperaments, be specially trained, be particularly interested in this type of work to be successful. Not all can be trusted, at all times, or any time, so be careful of those chosen, as their number is few. A good fever nurse makes for a good psychological effect on the patient and this is more than half the battle. Thanks to the sulfa drugs and penicillin, the drudgery of fever has been lessened greatly — only resistant cases now are so treated. Inadequate fever treatment may leave dormant infection and make a carrier as in the case of sulfa drugs at times.

M.C.L.McG.

Recent Evolution of Cold As an Adjunct to Surgery

R. T. McELVENNY (*Archives of Physical Therapy*, 25:599, Oct. 1944) reported the use of chipped ice in the treatment of a bilateral traumatic amputation in 1941. In 1942 several cases were reported in which cooling of the limbs was used in various surgical conditions; it was found that cooling could be maintained "for weeks" without pain or discomfort to the patient and without injury to the skin. Amputation was done under general anesthesia. Tourniquets were not used except at the time of operation. Since that time a machine has been developed and used for cooling of the limbs instead of using ice. This machine will cool to 10° F.; the rubber tubing through which the cooling fluid circulates is "held by material that is shaped to various parts of the body." The limb to be treated is placed in a layer of thin towels or gauze and the flexible

attachment to the machine wrapped around it; the machine is then adjusted to the temperature desired and turned on. This machine is electrically driven and "practically noiseless." As the temperature is lowered gradually, the "shock" of ice therapy is avoided. It has been found that in patients with traumatized and infected limbs that are subjected to cold therapy, the absorption of toxins is diminished, the infection is held in abeyance, and pain is eliminated or greatly diminished. Hence such application of cold makes it possible to delay amputation and to build up the patient's general condition, until a suitable anesthetic can be given and a carefully planned operation performed. The author prefers this method to immediate operation, using cold to produce anesthesia, in most cases. If the temperature is reduced to 10° F., the portion of the limb involved is "frozen solid." Patients have been kept in this condition for as long as eight weeks, during which time they are comfortable and the limb "for all practical purposes" is amputated. On the day that operation is to be done, the cooling apparatus is removed about twenty minutes before operation, the towels being left around the limb. The remaining portion of the limb is thoroughly cleansed with soap and water, and the patient is "put to sleep." The limb is elevated, the tourniquet applied, and amputation done. In the cases treated by this method, there have been no deaths before, during or after operation. No drains were used; and the wound healed by primary intention in all but one case. Temperature readings have shown that the temperature of the limb above the site of amputation returns to normal gradually. The author's associate, Ernst Dehne, has found that application of ice bags around the limb proximal to the site of amputation as well as ice packs at the operative site markedly relieves postoperative pain and reduces muscle spasm. A machine has been employed that produces "super-ice" which can be used for packs for application to any part of the body to produce the desired degree of cold. If this material is used with ice, the ice lasts much longer than in the usual type of ice pack.

COMMENT

Continuing his studies in the use of Refrigeration Anaesthesia in Amputations, McElvenny reports further observations on the effects of ice prior to, during and after operation and finds the results justify the method, as already demonstrated by other workers. The original paper by F. M. Allen, Experiments Concerning Ligation and Refrigeration in Relation to Local Intoxication and Infection (Surgery, Gynecology and Obstetrics, *June, 1939), should be required reading for all attempting this work, together with the report of the original work by Allen and Crossman and their co-workers at the City Hospital, New York, where, for the first time, the high mortality rate in amputations among the old and debilitated was decidedly and quickly lowered—from almost certain death it dropped to less than 20%. It is well to remember that all this work stemmed from the epoch-making research of Temple Fay and Smith in their studies of the effect of cold on plants and organisms of various kinds in their cancer studies.*

The local effect of cold, anaesthetic and analgesic, has been known since Hippocrates prescribed it, so we are again returning to its early use after a long lapse. Cold to arrest inflammation and infection is common surgical procedure. The ice coil was used formerly on the abdomen in typhoid fever. For surcease of pain in cancer cases the local icewater coil delivered coolth from special machines as used at Lenox Hill Hospital in 1939. Ice making machines and machines for cooling have been described at length in these pages previously. No research is ever lost, ever forgotten—the sulfa drugs were discovered in the early years of this century by two German chemists who probably were prevented from further study by World War 1. DDT, likewise discovered by a German chemist decades ago, is now regarded as one of the wonder workers of this war. Penicillin, found by the Scotsman, Sir Alexander Fleming, in 1929, is having its heyday in 1945. *M.C.L.McG.*

Some Physiological Effects of Passive and Active Exercise

E. C. FRIES (*Archives of Physical Therapy*, 25:540:546, Sept. 1944) reports a study of effects of graded active and passive exercise on the cardiovascular system and on various muscle groups. In these studies an electrically driven stationary bicycle ergometer was employed with which exercises could be graded from the completely passive to hard muscular work. This machine had the "unique" feature of exercising the large supporting trunk muscles simultaneously with the muscles of the upper and lower extremities. In the study of the effects of exercise on the cardiovascular system, 2 normal young women who were accustomed to "vigorous

activity" were the test subjects. It was found that passive exercise had practically no effect upon the cardiovascular system. With partial resistance to the movement of the machine, there were slight circulatory changes; with vigorous assistive work, "hard exercise," there was a definite increase in heart rate and rise in systolic blood presure that persisted for at least an hour after the exercise was completed. Other exercise studies on normal untrained subjects, patients with cardiac disease, and those convalescing from illness indicate that the type of the cardiovascular response to exercise is very similar in all cases, the difference being in the amount of work necessary to induce "excessive circulatory response."

In the studies of "training effects" on the strength of the muscles of specific muscle groups, 11 normal young women who had had physical training were the test subjects. It was found that the exercises on the electrically driven bicycle ergometer resulted in the most definite increase in the strength of those muscle groups that were made to "develop active tension," particularly the shoulder and abdominal muscles. Nothing in this study indicates whether or not the rise in muscle power due to active exercise was enhanced by the fact that the active exercise was accompanied by the "inciting stimulus" of rhythmic and varied passive movements.

COMMENT

These interesting experiments warrant careful study for evaluation and application. Clinicians have long observed the superiority of active exercise over passive exercise, and especially the superiority of active, resistive movements to any other. Passive exercise is of service in certain conditions, as stiff joints caused by contracted ligaments and muscles, to prevent fibrositis and to overcome stasis in circulatory diseases, but it lacks the stimulating effect of active movements.

The circulatory system responds most readily to graduated gymnastics. Heart muscle can be trained to exertion and compensation by systematic exercise provided no acute lesion exists. Schott's resistive exercises are based upon graduated resistance to the patients movements, thus increasing the work of the heart as it improves. These exercises are chiefly for mitral and aortic insufficiency. Myocarditis calls for passive movements at the joints, with kneading and stroking, to overcome peripheral resistance.

Dysfunction of the Digestive System shows itself in constipation, indigestion, flatulence, gastro-enteritis, haemorrhoids, visceroptosis and obesity. All these conditions may be helped by exercise and the development of good body mechanics. The diaphragm and abdominal walls by their activity increase peristalsis, acting especially on the liver and gallbladder. Increased activity causes greater demands for food, improves absorption and assimilation, hence stimulates general body nutrition.

Pelvic disabilities of the functional type may be helped by equalising the circulation, correcting uterine malpositions and developing the muscles of the abdomen and perinaeum. Active postural exercise will relieve pain, amenorrhoea, dysmenorrhoea, menorrhagia, metrorrhagia, headache, backache and excessive fatigue, when persisted in. Exercises given before and during pregnancy can do much to eliminate the usual discomforts of pregnancy and parturition, and exercises postpartum make for more rapid recovery of health and strength.

All exercise affects the respiratory system which 1) then increases external aeration of the blood, producing more oxygen for internal respiration, 2) stimulates the return of venous flow to the heart, 3) increases the activity of the diaphragm during inspiration, thus causing massage of the abdominal organs and promoting the flow through the portal vein and inferior vena cava.

Exercise is essential to life and health and its lack means early loss of strength and softening up.

M.C.L.McG.

PUBLIC HEALTH, INDUSTRIAL MEDICINE AND SOCIAL HYGIENE

Benign Pulmonary Changes in Arc-Welders

J. A. GROH *(Industrial Medicine,* 13:598, Aug. 1944) reports x-ray examination of the chest in 83 arc-welders, most of whom had worked at welding for several years. All men who gave a history of previous exposure to silica dust were excluded. A peculiar fine "nodulation" evenly distributed over the lung fields was found in 71 per cent of the 83 welders examined. These positive cases were classified in 2 groups, "minimal" and "extensive" according to the extent of lung involvement. In the minimal group

the mottling was "softer" and was confined to the central lung fields. In the extensive group the mottling was denser and wide-spread, including apex and bases. Even in the extensive cases, the hilus regions were not enlarged or prominent; there was no fibrosis, no thickened septa, no inflammatory changes of any kind and no thickened pleura. None of these workers showed signs of active tuberculosis; five men showed fibrotic or calcified adult type lesions, without any evidence of reactivation. These pulmonary changes cause no physical disability but welders should be instructed as to the benign nature of lesions so that they may not be disturbed or alarmed by any subsequent x-ray findings that might be misinterpreted. Pathological studies reported by others show that the mottling seen in arc-welders' lungs is due to iron oxide. While on the average the extent of the siderosis increases with the length of employment as a welder, there are some men working at the trade for many years who do not show any lung lesions; lesions were not observed in any person working less than six years at welding. The welding operations in the series studied were not carried out in "small confined spaces," such as the inside of tanks; but the high incidence of lung mottling in these cases indicates the need of adequate ventilation in all arc-welding operations.

COMMENT

It is especially important that arc-welders be instructed in the usual benign character of the lesions in order that they will not "be disturbed or alarmed by any subsequent x-ray findings that might be misinterpreted." Possibility of an arc-welder with siderosis subsequently developing pulmonary tuberculosis should always be considered; hence, such a person should not be led to believe either that siderosis and tuberculosis are incompatible or that pulmonary tuberculosis cannot subsequently develop.

E.G.B.

Gonorrhea Contacts— Criteria for Management

J. H. LADE (*American Journal of Public Health*, 34:474, Sept. 1944) states that between 1936 and 1942, an average of 1,480 cases of early syphilis were reported each year from "upstate New York"; and an average of 6,022 cases of gonorrhea. During the last three years an average of 609 cases of early syphilis in males was reported annually as compared with 4057 cases of gonorrhea in males. This ratio of 6.7 times as much gonorrhea as syphilis among males compares favorably with the report on military personnel quartered in upstate New York, which shows gonorrhea 4.5 times as prevadent as syphilis. Four out of every five cases of gonorrhea reported to the New York State Department of Health have been in males. But if the number of cases is actually the same in each sex, there were more than 2,800 undiagnosed cases of gonorrhea among women in upstate New York in 1942. Such relative infrequency of diagnosis in women "makes for a great reservoir of infection in the population." For adequate control of gonorrhea, it is necessary to find and treat these infected women. During the war, there is "an unprecedented opportunity" to identify cases of undiagnosed gonorrhea in women through the contact reports of the armed forces. But control by this method is made difficult in some instances by the difficulty of making a positive diagnosis of gonorrhea in women even by cultural methods. In practice, it has been found that the gonococcus culture is "a cumbersome tool for case finding" but is of value in routine diagnosis and more especially in determining the success of treatment. To meet this problem, the New York State Department of Health has distributed sulfathiazole to physicians with a circular of instruction advising its use for a full course of treatment when a woman named as a contact admits the exposure; when a woman is named by more than one patient in whom a diagnosis of gonorrhea has been made; or when a woman named as a contact has physical findings suggestive of gonorrhea although laboratory findings are negative. The circular states that this is advised "as the safest course of action" since reactions to the drug in the doses recommended are infrequent. Case reports or other identification of the patient are not required in these cases. The same advice is given verbally when a contact found by investigation is referred to a local clinic or to a physician.

COMMENT

The apparently large number of unrecognized gonorrhea cases among females emphasizes the importance of repeating smears and cultures in an effort to establish diag-

nosis. Physicians who are treating suspected cases with a single course of sulfathiazole should advise such persons regarding sex contact. If this practice becomes routine it is possible: (1) there may be a further reduction in reported cases among females; (2) fewer smears and cultures will be done at time of initial examination and for follow-up; and (3) infected women who either were sulfa-resistant at the time of the first examination or who become resistant during the time sulfa is given on presumption, will assume they are incapable of transmitting the infection.

E.G.B.

Salmonellosis as a Public Health Problem in Wartime

A. D. RUBENSTEIN and associates in the Massachusetts Department of Health (*American Journal of Public Health*, 34:841, Aug. 1944) have found that under wartime conditions, the control of Salmonella infections becomes more difficult. Factors that tend to increase the incidence of these infections include overcrowding in rapidly expanding industrial centers, and a constant shifting of population due to labor shortages. In 1937 Salmonella infection was made a notifiable disease in Massachusetts, and all reported cases have been investigated epidemiologically; whenever possible bacteriological examinations of the stools were made "at suitable intervals" to determine the total period of infectivity. Contacts were studied for evidence of "clinical or subclinical" disease. From 1937 to July 1943, it was found that the number of epidemic cases varied widely from year to year, but the number of sporadic cases remained fairly constant. The epidemics studied were found to be caused by seven varieties of the Salmonella organisms. Eleven of the epidemics were "food-borne," and these outbreaks, with one exception, were due either to *S. typhimurium* or *S. paratyphi B*. In an investigation of 295 sporadic cases, 113 additional Salmonella infections were found among the contacts; 46 of these contacts (41 per cent) showed clinical symptoms, while in 67 (59 per cent) the infection was subclinical. Studies of household contacts of 237 sporadic cases showed multiple infections in the family in 59 instances (24.9 per cent); 2, 3 and 5 infected contacts were found respectively in 12, 4 and 6 families. In sporadic cases, *S. paratyphi B, S. typhimurium, S. newport and S. oranienburg* were the types most frequently found. In 811 cases studied for duration of infectivity, 15 permanent Salmonella carriers were found and 24 others in which infection persisted for six months or longer. Approximately 61 per cent of *S. paratyphi B* cases and 43 per cent of *S. typhimurium* cases were infective four weeks after onset of the disease. In the eighth week after onset, persistent infection was found in 21.6 per cent of *S. paratyphi B* cases, in 12.9 per cent of *S. typhimurium* cases, and 20.8 per cent of all other types. From these studies the authors conclude that "the interchange of Salmonella organisms between man and other hosts" is not the most significant factor in the epidemiology of salmonellosis. In many instances the spread of Salmonella infection from case to case has been observed. The authors are of the opinion that Salmonella infection "spreads through the population in small groups of clinical and subclinical cases"; and that subclinical infections, unrecognized and unreported cases are more important than chronic carriers. All reported cases of Salmonella infection have recently been kept under observation as long as they remained infectious. By keeping infected food handlers from their occupations, and "breaking chains of spread" of the infection, it is possible that some outbreaks of the disease have been prevented.

COMMENT

Reporting of Salmonella infections in Massachusetts and other states has resulted in greater knowledge concerning prevalence of the disease. There are numerous strains of the organism yet the authors disclose the outbreaks in Massachusetts have been due to seven principal varieties. In comparison with typhoid fever Salmonella infection is an infrequent cause of mortality. However, Salmonella infaction is a frequent cause of infection as manifested by the occurrence of sporadic cases or outbreaks. Laboratory examination of stool specimens from diarrhea cases is of proven value in detecting the presence of Salmonella infection and establishing a diagnosis.

E.G.B.

Outlook for Tuberculosis Control in the Civilian Population

THOMAS PARRAN (*American Review of Tuberculosis*, 50:365, Nov. 1944) states that while wartime conditions involve danger of an increase in tuberculosis, special methods have been devised by

which cases may be detected early and at a minimum expense. Since 1939, the use of the small-film x-ray for the diagnosis of tuberculosis in various population groups has been developed. Since the entry of the United States into the war, the Public Health Service has employed several mobile small-film x-ray units for "mass case-finding" among war workers and their families—"the most vulnerable group" in the civilian population. Nearly three-quarters of a million persons have been examined, and evidence of reinfection tuberculosis has been found in 1.3 per cent. The majority of the cases of tuberculosis discovered in this way (62 per cent) are in the minimal stage; 31 per cent are moderately advanced, and 7 per cent far advanced. With cases discovered in the early stage recovery is "almost certain" with good care. An effective program for tuberculosis control in the United States must provide for follow-up and adequate treatment for every case of tuberculosis discovered by x-ray examinations of large population groups, through the cooperation of Federal, State and local health organizations, "official and voluntary." Prompt treatment should be available for every active case, especially in the early stage. Persons with inactive disease should have periodic examinations, including x-ray. All "open" infective cases of tuberculosis should be strictly isolated. "Intensified" health education in regard to tuberculosis and its control should be carried on among the general population, and with tuberculous patients and their families.

COMMENT

The author summarizes mass case finding methods which yielded 62 per cent minimal cases. In comparison Health Practice Indices, 1943, based on schedules submitted by local health officers of 178 communities spread over 32 states and 4 provinces in Canada, reported 24.2 per cent of cases in the minimal stage. Authorities are generally agreed that the active case should be hospitalized—both for his own good and as protection to the members of his family and the community at large. In order to better the tuberculosis control program, more hospital beds and more vigorous efforts to get active cases into hospitals are needed. E.G.B.

THERAPEUTIC NOTES

—Concluded from page 111

of cases are those patients who move from one pollen zone to another, and for whom, hitherto, little could be done. It is a well-known fact that the United States and Canada have been divided into several "Pollen Zones"; and it is not possible to give patients pollen in one zone which will protect them from the pollen in the air in another zone. Consequently, several different solutions must be prepared for such individuals, dependent upon the number of zones through which they will be passing. Detailed instructions are given them in writing relative to dosage, and the change from one oral antigen to another; and remarkable results have been obtained among this hitherto difficult-to-treat group of patients.

ALMOST unbelievable are the statistics on hay fever and resultant asthma—nine million victims in 1943; ten and one-half million in 1944—an increase of one and one-half million sufferers, a figure which, due to labor shortages and inadequate weed control, seems destined this year to increase.

It would seem imperative, in these days of limitless demands on manpower, that some more specific information and education be afforded the public relative to this increasing and incapacitating ailment, and its control. Hay fever and asthma debar men and women from active military service. They ground fliers, often for months at a time. They slow the wheels of production on the home front with mounting absenteeism.

Yet oral pollen therapy — simple, effectual, economical, and safe — obviously destined one day to entirely replace the older, more hazardous, and often ineffectual hypodermic method of treatment, still remains, to millions of sufferers, an unknown means of relief.

1024 REPUBLIC BUILDING

Medical BOOK NEWS

Edited by
ALFRED E. SHIPLEY, M.D., Dr. P.H.

All books for review and communications concerning Book News should be addressed to the Editor of this department, 1313 Bedford Avenue, Brooklyn 16, N. Y.

GREGOR JOHANN MENDEL
1822 ~ 1884

Classical Quotations

● **In this [first] generation there reappear, together with the dominant characters, also the recessive ones with their peculiarities fully developed, and this occurs in the definitely expressed average proportion of three to one, so that among each four plants of this generation three display the dominant character and one the recessive. This relates without exception to all the characters which were investigated in the experiments.**

GREGOR JOHANN MENDEL

Experiments in Plant-Hybridization. *Verh. naturf. Ver. in Brunn, Abhandlungen*, IV. 1865, which appeared in 1866.

For the Woman Patient

The Woman Asks the Doctor. By Emil Novak, M.D. 2nd Edition. Baltimore, The Williams & Wilkins Co., [c. 1944]. 130 pages, illustrated. 8vo. Cloth, $1.50.

A REMARKABLY valuable little book, delightfully and simply written for the woman who is curious about the real business of being alive. No physician need have the slightest hesitation in recommending this volume to his women patients.

CHARLES A. GORDON

Basic Factors in Metabolism

Proteins and Amino Acids. Physiology, Pathology, Therapeutics. Prepared under the supervision of the Scientific Staff of The Arlington Chemical Company. Yonkers, The Arlington Chemical Co., [c. 1944]. 173 pages, illustrated. 8vo.

THIS commercial brochure is a striking example of how much of the literature prepared by the more reputable commercial drug houses can be utilized by the discriminating doctor.

This review of proteins and amino acids, although far too sketchy for the expert, contains as much as the general practitioner is likely to need. It is well organized and presented and, even though incomplete for the specialist, is an accurate presentation of a subject to which more and more attention is being paid.

MILTON PLOTZ

British Treatment

Textbook of Medical Treatment. By various authors. Edited by D. M. Dunlop, M.D., L. S. P. Davidson, M.D. & J. W. McNee, M.D. 3rd edition. Baltimore, The Williams & Wilkins Co., [c. 1944]. 1,218 pages, illustrated. 8vo.

THIS book appears to be a favorite text in the British Isles. It has gone through three editions and two reprints in five years. It might be argued that this phase of medicine is fully covered by American texts. It is nevertheless the opinion of the reviewer that no book on Treatment is superfluous no matter how many one may possess. And since this work is a compilation of the experience of specialists in the subjects they cover, their viewpoint, even if it varies here and there from what is accepted in this country, is always interesting and instructive. In a text with an edition dated May 1944, the complete omission of penicillin is "therapeutically" shocking.

S. R. BLATTEIS

An Occupational Hazard

Lead Poisoning. By Abraham Cantarow, M.D., and Lt. Comm. Max Trumper, H-V(s), USNR. Baltimore, The Williams & Wilkins Co., [c. 1944]. 264 pages, illustrated. 8vo. Cloth, $3.00.

THIS volume is a useful addition to the literature on lead poisoning. The twelve chapters contain a complete discussion of the subject of absorption, transportation, deposition and excretion of lead, pathology and pathological physiology, clinical manifestations, lead in biological materials, treatment of lead poisoning, and procedures for determination of lead. The chapters on pathology and physiology are most detailed and excellently presented. The usefulness of the book is enhanced by the extensive bibliography.

IRVING GRAY